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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Kevin J. KAYSER  
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Serial No.: 10/658,691

Filing Date: 09 September 2003

Title: METHOD FOR METABOLIZING  
CARBAZOLE IN PETROLEUM

Group No.: 1651

Examiner:  
Kosson, Rosanne

**RESPONSE TO ELECTION/RESTRICTION REQUIREMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This Communication is being filed in response to the Office Action mailed 14 May 2004 whereby the Examiner has indicated that Applicants are required to make an election whereby examination of the subject application will be restricted to one of twelve (12) inventions alleged by the Examiner to be claimed in the subject application. Applicants respectfully traverse this election/restriction requirement.

I hereby certify that this correspondence (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on

24 May 2004

24 May 2004  
Date

Mark E. F...  
Signature

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The subject application contains a total of eight (8) independent claims out of a total of twenty-four (24) claims. The crux of the invention claimed by Applicants is a microorganism capable of selectively cleaving a C-N bond.

Claims 1-3 are directed to a method for biodegradation of carbazole using a microbial strain capable of expressing a carbazole degradation trait constitutively. Carbazole is an organic nitrogen-containing heterocyclic compound and degradation of carbazole involves the cleavage the C-N bonds thereof.

Claims 4-7 are directed to a method for removal of nitrogen from nitrogen-containing fossil fuels using a microbial strain capable of expressing a carbazole degradation trait constitutively. Here too, cleavage of C-N bonds present in the fossil fuel is the operative function of the microbial strain.

Claims 8-16 are directed to a method for selective cleavage of C-N bonds using microbial strains which are selectively capable of cleaving C-N bonds.

Claims 17-19 are directed to an operon that encodes for enzymes capable of selectively cleaving C-N bonds in carbazole.

Claims 20-21 are directed to a bacterial culture capable of selective cleavage of C-N bonds.

Claim 22 is directed to a DNA sequence.

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Claim 23 is directed to a biologically pure culture of mutant *Sphingomonas sp.* strain ATCC No. BAA-487.

Claim 24 is directed to a biologically pure culture of nitrogen selective mutant *Sphingomonas sp.* strain ATCC No. BAA-487 capable of selectively reducing the nitrogen content of nitrogen-containing fossil fuels.

The Examiner has required restriction to one of the following inventions:

- I. Claims 1-3, drawn to a method for carbazole biodegradation, classified in class 435, subclass 262.5
- II. Claims 4-7, drawn to a method for removal of nitrogen from nitrogen-containing fossil fuels, classified in class 435, subclass 281
- III. Claims 8-10 and 15, drawn to a method for selective cleavage of C-N bonds using *Sphingomonas sp.*, classified in class 435, subclass 128
- IV. Claims 8, 9, 11 and 15, drawn to a method for selective cleavage of C-N bonds using *E.coli*, classified in class 435, subclass 128

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- V. Claims 8, 9 and 12, drawn to a method for selective cleavage of C-N bonds using *Sphingomonas sp.* and *Pseudomonas resinovorans*, classified in class 435, subclass 128
- VI. Claims 8, 13, 15 and 16, drawn to a method for selective cleavage of C-N bonds using *Rhodococcus erythropolis*, classified in class 435, subclass 128
- VII. Claims 8, 14 and 16, drawn to a method for selective cleavage of C-N bonds using *Pseudomonas sp.*, classified in class 435, subclass 128
- VIII. Claims 8 and 15, drawn to a method for selective cleavage of C-N bonds using *Thermus thermophilus*, classified in class 435, subclass 128
- IX. Claims 17-19, drawn to an operon encoding enzymes capable of selectively cleaving both C-N bonds in carbazole and a bacterial culture comprising the operon, classified in class 536, subclass 23.2
- X. Claims 20-21 drawn to a bacterial culture, classified in class 435, subclass 252.3

- XI. Claim 22 drawn to a DNA sequence comprising a *carA* gene from *Sphingomonas sp.* and at least one amidase gene and a biologically pure culture of *Sphingomonas sp.* comprising the DNA sequence, classified in class 536, subclass 23.2
- XII. Claims 23-24 drawn to a biologically pure culture of *Sphingomonas*, ATCC No. BAA-487, classified in class 435, subclass 252.3

The Examiner indicates that the inventions of Groups I and II, Groups I and any of III-VIII, and Groups II and any of III-VIII are materially distinct methods which differ at least in objectives, method steps and reagents used. The Examiner further indicates that these inventions are unrelated processes, that is not disclosed as capable of use together and having different modes of operation, different functions and different effects. Applicants respectfully disagree. As previously indicated, the common element of all of the alleged inventions of Groups I-VIII is the selective cleavage of C-N bonds. Similarly, Claims 20-21 recite a bacterial culture capable of selective cleavage of C-N bonds and the *Sphingomonas sp.* claimed in Claim 24 is specifically recited as being able to reduce the nitrogen content of fossil fuels, i.e. cleaving C-N bonds. In the alleged invention of Group I, the C-N bonds are a component of carbazole, which may be an element of fossil fuels, to which the alleged

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invention of Group II is directed. In the alleged inventions of Groups III-VIII, Claim 8 is an independent claim directed to a method for selective cleavage of C-N bonds and Claims 9-16, all of which depend from Claim 8 set forth various embodiments of the claimed method. Accordingly, Applicants respectfully urge that these inventions are not unrelated as alleged by the Examiner, and they do not have different modes of operation, different functions and different effects. In all cases, the function and effect are the same, i.e. selective cleavage of C-N bonds.

Applicants further respectfully urge that the alleged inventions of Groups III-VIII are related as genus and species, wherein Claim 8 is a generic claim (MPEP § 806.04(d)). Applicants further respectfully urge that if Claim 8 were to be allowed in its present form, then each of the claims dependent therefrom would also be allowable. However, the Examiner has not identified Claim 8 as a generic claim with respect to the alleged inventions of Groups III-VIII. Accordingly, at least to that extent, Applicants respectfully urge that this election/restriction is improper. Similarly, if Claims 20-21 were found to be allowable, Applicants respectfully urge that Claims 1-16 and 24 would also be allowable because each of these claims involves the use of a microbial culture capable of selectively cleaving C-N bonds. However, no such relationship between these claims has been identified by the

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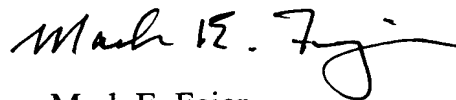
Examiner. Accordingly, Applicants respectfully urge that this election/restriction is of improper form and respectfully request that it be withdrawn.

Notwithstanding, because Applicants are required to make an election in response to this election/restriction requirement, Applicants hereby elect to prosecute the invention of Group X, Claims 20-21 drawn to a bacterial culture capable of selective cleavage of C-N bonds.

Applicants intend to be fully responsive to the outstanding Office Action. If the Examiner detects any issue which the Examiner believes Applicants have not addressed in this response, Applicants urge the Examiner to contact the undersigned.

Applicants sincerely believe that this patent application is now in condition for examination and, thus, respectfully request early allowance.

Respectfully submitted,



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